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ON THE REMOVAL OF FOREIGN BODIES FROM THE EYE. WITH FOUR CASES.

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ON THE REMOVAL OF FOREIGN BODIES FROM THE EYE. WITH FOUR CASES.*

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In considering the subject of foreign bodies within the eye, we naturally make certain sub-divisions, with reference to the locality of the foreign body, to that part of the eye in which the particle lies or is embedded. This seems to be the point of greatest importance, both in regard to prognosis and to the steps to be undertaken for its removal. Though at one time in the history of ophthalmic surgery it was quite customary to attempt the removal of a foreign body from the eyeball, without much reference to its locality, yet there subsequently came a reaction which ran to as great an extreme in the other direction. During the past ten or twelve years the pendulum of surgical opinion has swung back on its path somewhat away from this last extreme, and we now operate and attempt to remove foreign bodies from the eye in many cases which a few years back we should not have touched. Though our statistics upon this class of cases are hardly sufficiently full as yet to admit of the formulation of a rule as to operating, yet there are certain points which already seem in a fair way to be settled. From the reports of cases it appears that where the presence of a foreign body is suspected, though the particle itself is not seen, an attempt at probing for it, even when in the vitreous, may not do any harm and may almost be justifiable. When such a search has failed of any result, and we have reason to fear that the body lies in the vicinity of the ciliary muscle and processes, or perhaps anywhere in advance of the equator of the eye ball, the question of an operation for its removal should be seriously considered before enucleation is resorted to. These attempts at removal, by opening the eyeball at some point opposite the wound of entrance, are of course more promising where the media are sufficiently clear to admit of an ophthalmoscopic examination.

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* Read before the State Medical Society at Albany February 3, 1880.

When a foreign body is seen in the lens or is suspected to be there, the question of its removal depends much upon the extent of clouding or swelling of the lens. Cases are on record in which a foreign particle, usually of metal, has remained encapsulated within the lens for years, surrounded by a localized opacity, while the rest of the lens has remained partially or entirely transparent. In such a case non-interference may perhaps seem the best plan, though it should not be forgotten that the foreign body may become at some later period disengaged from its surroundings, and either drop to the bottom of the lens by force of gravity, or may perforate the capsule, fall into the vitreous, and find a lodgement upon the ciliary processes, where it is sure to cause destructive inflammation within a very short time, and necessitate the removal of the eye.

If the foreign body is in the iris, or at the bottom of the anterior chamber, there is no hesitation in saying that its removal should be attempted at once. If the latter is the case, the anterior chamber should be opened below, either by a lance knife or Graefe's narrow knife, and the foreign body seized and withdrawn. With care this may be done and the operation completed without the need of an iridectomy. If the particle is embedded in the iris, it is better to excise the sector of iris containing it, either at once, or subsequently to the removal of the particle, as there is less danger of severe inflammation from an incised iris than from a lacerated one.

If the foreign body has perforated the eyeball and has lodged in the posterior half of the globe, and can be seen with the ophthalmoscope embedded in the retina, there may be considerable doubt in regard to any attempt at its removal. Cases are on record where such bodies have remained encapsulated in the retina or choroid for years without causing any trouble except the scotoma in the visual field corresponding to their position. There seems to be a marked freedom from irritability in this part of the eye, which justifies us in feeling less alarm for an eye where the foreign body is situated in the retina, than when the particle lies more anteriorly. Dr. Knapp has very justly said that "the cases of successful or partially successful removal of foreign bodies from the vitreous chamber and its surrounding walls are so rare, that they may be considered almost as exceptions." Hence when such a case of a foreign particle lying in or upon the retina, encapsulated or not, is met with, it is perhaps better to leave it alone and content ourselves with keeping tne case under observation. One reason for the lack of success in the removal of these particles from the vitreous no doubt lies in the fact that very often they cannot be seen, nor can their location be determined owing to the opacity of the vitreous or other media, resulting from the intraocular inflammation.

It is not the intention of the writer to give here any detailed historical account of the subject, the literature of which has already obtained respectable dimensions. He would simply refer to the excellent papers of *Berlin* in the *Archiv für Ophthalmologie*, Bd. xiii and xiv; to *Knapp's* articles in the *Archives of Ophthalmology*, vol. vii and viii; and to the report of a singular case by *von Jaeger* in the *Archives of Ophthalmology*, vol viii, No. 3.

The following four cases of foreign bodies in the eye, in all of which the particle was removed and the final result was successful, were under the writer's own care and observation. Each of the four represents a different injury, both as regards the location of the foreign body and the severity of the damage done.

CASE I.—*A piece of copper shell from a pistol embedded in the cornea and projecting into the anterior chamber.*

Patient was a boy, W. D., æt. 9, who, four days before I saw him, had been wounded in the right eye by the explosion of a small pistol. When first seen, there was a ragged wound in the cornea, just below and to the nasal side of the centre, with an extensive zone of purulent infiltration around it, involving nearly a third of the diameter of the cornea, but no foreign body was visible. There was a layer of coagulated blood at the bottom of the anterior chamber, and above this was a stratum of pus. The pupil was contracted and only slightly movable, but there was no exudation into the field of the pupil, and no cataract visible. The iris did not appear to have been wounded, though of course the infiltrated cornea prevented an accurate examination. The circum-corneal injection, superficial and deep, was very marked, and the boy complained of severe pain. The presence of a foreign body was suspected in the eye, but it was thought that as there was no apparent wounding of the lens or iris, the particle might have penetrated the cornea and dropped into the anterior chamber, and that it was probably at the bottom covered by the blood and pus. It was decided to attempt nothing in the way of an operation, but to direct the constant use of hot water and atropia, with opium to relieve the pain. The tension was reduced. T — 1, and the boy had only perception of light.

On the fourth day after his visit, the eye was looking better. The hypopyon had all disappeared, the blood in the anterior chamber was almost entirely absorbed, and the lower part of the cornea so clear that it was evident that there was no foreign body lying at the bottom of the anterior chamber. The pupil was dilated and the lens perfectly transparent. The central corneal infiltration had diminished somewhat, and by strong oblique illumination a glistening piece of metal could be seen projecting from the posterior surface of the cornea toward the lens. Its point was very sharp, and protruded so far backward into the anterior chamber that it almost touched the capsule, and with an undilated pupil and in full accommodation, it must have scraped against the iris. The iris was no doubt slightly lacerated at the time of the injury, which accounted for the blood in the anterior chamber. The capsule was fortunately not injured, owing to the interposition of the iris. The pain had ceased, and the ocular injection was less marked.

It was decided to attempt the removal of the piece of metal at once, and not to wait until it had worked its way into the anterior chamber, for in this process the lens might be wounded. The boy was etherized, and the cornea transfixed by a rather broad Graefe's cataract knife, the point of entrance being made through clear cornea on the temporal side of the foreign body, and the point of exit through clear cornea on the nasal side of the foreign body. The blade of the knife was then pressed firmly against the end of the metallic splinter, and thus the latter against the cornea, while the knife also served as a means of fixing the eyeball. The wound made by the exploded shell was then carefully enlarged with a broad needle, working upon the blade as a foundation, until the bit of copper could be seen. The needle was then discarded, and the foreign body seized with a pair of transversely grooved dissecting forceps with fine blades, and after some little difficulty removed. During the latter part of the operation, just before the removal of the piece of metal, a whitish exudation was seen upon the capsule of the lens, which rapidly extended till it overspread the entire field of the pupil before the knife was withdrawn from the cornea.

When this last step was taken, atropia was instilled and the eye bandaged. At the end of six hours the bandage was removed and the eye opened, and the iris was found adherent to the cornea, not at the central laceration, but at the wounds of entrance and exit of the knife. Atropia was then instilled every hour until the toxic effect of the drug compelled its discontinuance. On the next day the synechiæ were broken, the pupil was widely dilated, and the exudation had entirely disappeared from the capsule. This latter accident I had never before observed, but in one of Knapp's cases (*Archives of Ophthalmology*, Vol. vii, Nos. 2, 3 and 4, p. 313) the same thing was noticed, and it vanished on the next day. The boy was discharged on the third day, and on the tenth day almost all signs of corneal infiltration had disappeared and his vision was $\frac{20}{\text{XL}+}$

CASE II.—*Piece of iron in the anterior chamber. Traumatic cataract.*

The patient was a man, P. F.. æt. 67. He was struck in the right eye two days before I saw him by a piece of a nail-head, which had been chipped off in striking it with a hammer. There was a perforating wound of the cornea near the lower region, about 2''' long, a small prolapse of the iris, the anterior chamber was about half full of blood, and there was a traumatic cataract.

The eye was not markedly injected, but the tension was slightly increased, and there was considerable pain. There was a strong probability of the foreign body being in the eye, but it could not be seen. Atropia and cold applications were ordered, and the patient was directed to keep perfectly quiet. The other eye had been injured some years before, and the vision was defective from an opaque spot in the cornea, being only $\frac{20}{50}$+. Vision in the right eye was reduced to distinguishing the movements of the hand.

On the third day after I first saw him, and on the fifth after the accident, the blood in the anterior chamber had become entirely absorbed, and a better view could be obtained of the parts behind. The prolapse of the iris had been diminished by the atropia, and the iris was found lacerated, the capsule opened and soft opaque lens matter oozing through the opening. In the bottom of the anterior chamber was a small piece of black metal, partially embedded in the prolapsed iris. The pain still continued, and it was decided to attempt the removal of the foreign body. The corneal wound, being almost in the limbus, was enlarged, the lacerated and prolapsed iris drawn out as far as possible, and a large piece excised, leaving a broad coloboma downward and outward. A strong pair of iris forceps was then introduced, and after two unsuccessful efforts the foreign body was seized and extracted. It was followed by some lens matter and a little blood. After waiting a few minutes the capsule was opened freely parallel to the wound, and then by pressure and counter-pressure on the eyeball the soft cataract was slowly squeezed out, though a considerable part of it remained behind, and could not be extended. Atropia and a double bandage were then applied, and the case watched with great anxiety. Violent iritis followed, with partial blocking of the coloboma by exudation, and the cornea became infiltrated. The inflammatory action was so violent that the bandage had to be removed, and hot fomentations, atropia and leeches, were employed. The inflammation slowly subsided, the cornea became clearer, and the pain almost ceased. But at the end of six weeks it was seen that a general atrophy of the globe was to be the final result. The coloboma became clear in part, so that at present there is a vision of $\frac{10}{200}$, but the process having involved the ciliary body, the man cannot hope to retain the amount of vision at present possessed. At no time were there any symptoms of sympathetic trouble in the other eye, though this was feared from the beginning.

CASE III.—*Piece of iron in the iris and lens. Traumatic cataract.*

The patient was a man, J. S., æt. 45, who, six hours before I saw him, was struck on the left eye by a piece of iron from a chisel, struck by a large sledge in the hands of a fellow workman. When I saw him there was some swelling of the lids, injection and chemosis of the ocular conjunctiva, great intolerance of light, but not much pain. There was a ragged wound through the cornea just below the centre, the lips of which were distended by prolapsed iris, blood-clots and some soft lens matter. There was scarcely any anterior chamber, and the surface of the iris was covered with blood. It was thought that a foreign body of some sort could be seen embedded in the iris and lens, and through the part of the pupil that was visible, the lens was seen to be opaque. The iris was pushed forward by the swollen lens behind it, as well as drawn forward by the prolapse. The tension was slightly below normal.

The case seemed to demand immediate interference, in the hopes of saving some vision to the eye. The wound of the cornea, which was an irregularly rectangular laceration, would be in great danger of suppurating, especially if there was much pressure from behind. The prolapsed iris was therefore excised, and the lips of the wound separated, so that by pressure on the ball the soft lens matter might be squeezed out. After this had been done, and the iris partially replaced, a black point was seen projecting from the iris toward the cornea. The wound in the latter was then enlarged down to the limbus, and an attempt made to grasp the foreign body with a small pair of dissecting forceps. This failed, and the curette was then introduced and passed beneath the body, which it lifted out of its bed in the torn iris, and the curette was then withdrawn, still holding the foreign particle. This proved to be a rough scale of iron, somewhat pyramidal in shape, about $\frac{3}{16}$ of an inch long by $\frac{2}{16}$ of an inch broad, with its base projecting towards the cornea. The rest of the cataract was then extracted by means of pressure and a Daviel's spoon, and all ragged points of iris tissue cut off smooth. Atropia was instilled and both eyes bandaged.

In spite of the severity of the injury there was no violent reaction. There was some pain, which was relieved by frequent instillations of atropia, but the case did well from the beginning.

The iris became adherent to the corneal cicatrix, and there is now practically no anterior chamber. The tension has remained below normal, though the wound in the cornea has entirely closed. There is no pupil, but there is opportunity for an iridectomy inward toward the nose, which will give him useful vision. The field and projection are apparently uninjured.

The case has turned out very satisfactorily, and was a fortunate one from the start. The man was seen within a few hours of the receipt of the injury, the foreign body and cataract both removed, and absolute quiet enjoined and strictly followed out. Moreover the ciliary region was not injured, nor had the vitreous humor apparently been involved by the foreign body.

CASE IV.—*A piece of steel in the vitreous.*

The patient was a man, J. F., æt. 53, a cooper by trade, and was first seen by me Sept. 1, 1879. A few hours previously he had been struck on his right eye by a piece of metal from a hammer, as he was engaged in driving a hoop upon a barrel. The resulting inflammatory process had been very rapid, for there was hypopyum, iritis, a small amount of blood in the anterior chamber, and a slightly cloudy cornea. There was a small wound through the sclera in the upper equatorial region, extending backward for perhaps a quarter of an inch very nearly in a line with the inner margin of the superior rectus muscle. Through this wound the vitreous projected. There was no wound in the upper lid of any kind, and it was difficult to see how the foreign body could have entered the eye in this region without perforating the lid. There was no reflex from the fundus, so that the vitreous was probably full of blood. Vision was reduced to faint perception of light.

It was decided to delicately probe the wound in the sclera, which was done with a fine silver probe bent upon itself, but though the immediate vicinity of the wound was carefully examined in every direction, nothing was discovered.

Atropia and a protective bandage were ordered. Two days later the pus had disappeared from the anterior chamber, the pupil was irregularly dilated, mainly upwards; floating blood-clots could be seen in the vitreous, and in the upper and inner quadrant of the lens was a small opacity. A bead of vitreous

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Since the paper was written an iridectomy has been done inward, which has given him a vision of $\frac{20}{50}+$, nearly $\frac{20}{40}$.

humor was still projecting from the wound. On the next day there was a general haziness of the vitreous, as of a general hyalitis, but an indistinct view was gained of the optic disk. There was no pain and no signs of any sympathetic irritation. On Sept. 5th there was severe pain in the eye, but the other symptoms were about the same, and V. $=\frac{5}{100}$. The case progressed about the same until Sept. 12th, when there was observed a tendency to prolapse of the vitreous through the wound, and the bandage was reapplied. On Sept. 19th a very careful and rather protracted examination of the fundus was made, but nothing was found. The vitreous was slowly cleaning up, the opacity in the lens had not extended, and the ocular injection was disappearing. The scleral wound was still open ; with convex 10 spherical, V. $=\frac{20}{200}$.

On October 8th, thirty days after the injury, on examining the wound which was still open, I was tempted to use the probe again, and had scarcely introduced it into the opening when it struck against something hard. It was immediately withdrawn, and a foreign body then presented itself at the wound. A pair of small grooved dissecting forceps was introduced, and after several failures, the body was grasped and withdrawn. It had contracted adhesions to the vitreous and retina and no doubt was about to become encapsulated, and hence was removed with some little difficulty. It proved to be a piece of steel from the hammer, sharp at one end, and about one-fourth of an inch long. No bad results followed the removal of the foreign body, and the eye has steadily improved, so that at the last examination V. $=\frac{20}{70}$, with a prospect of still further improvement. The patient has informed me that the vision in the injured eye was always defective, owing to an inflammation which occurred in childhood, and he thinks it is as good now as it ever has been. This case was exhibited before the New York Ophthalmological Society at its meeting in October, 1879.